

Developing Coalition BML for Air Operations

Contact: Adam Brook (+44 (0) 1252 396427) RABROOK@QINETIQ.COM

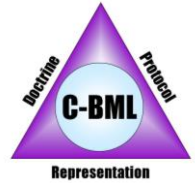
Adam Brook
Simulation and Training Group
QinetiQ
Farnborough
GU14 0LX
UK

February 2010

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE FEB 2010		2. REPORT TYPE N/A		3. DATES COVERED -	
4. TITLE AND SUBTITLE Developing Coalition BML for Air Operations				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) DSTL; QinetiQ				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES See also ADA564685. 2010 Coalition Battle Management Language Workshop (Atelier 2010 sur le langage de gestion du champ de bataille pour les operations en coalition). RTO-MP-MSG-079					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT SAR	18. NUMBER OF PAGES 11	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



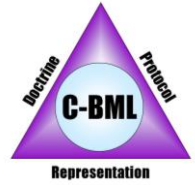
BML for Air Operations



- Aims:
 - To permit a BML capability in Joint Air-Land environment
 - To represent Air Tasking Order & Airspace Coordination Orders in C-BML
 - To permit simulated aircraft to be controlled using BML orders
 - To provide a Recognised Air Picture for use in, e.g., a Brigade C2 cell
- Benefits:
 - Orders and Reports are available to any federated BML system
 - Tactical graphics may be shared with other users, e.g. air corridors, SEADs
 - Air tasking may be generated by any BML-capable air planning system
 - Reports from ground units may be displayed on air C2 systems
 - Swivel chairs eliminated

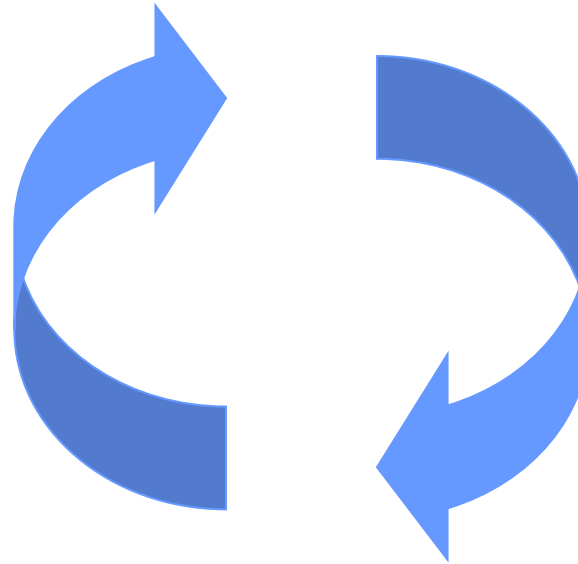


Joint Fires Targeting Cycle



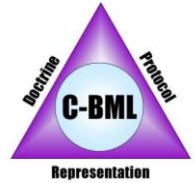
1. Objectives
2. Targets
3. Weapons
4. Force Application
5. Planning & Execution
6. Assessment

C-BML Can help here





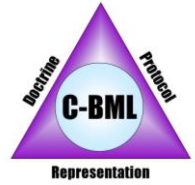
The ACO – Airspace Coordination Order



- Lists ACMs – Airspace Control Means
 - Geometrical features, e.g. routes, race-tracks, SEAD areas
 - May be constrained by flight levels
 - May be given temporal properties, when active, dormant, expired, etc
 - May be associated with control command networks
 - May be parameterised, e.g. race-tracks, circular orbits
- C-BML permits control measures to have temporal rules associated
- ACOs used to coordinate and deconflict air operations
- ACOs are used to specify the control measures associated with C-BML Orders



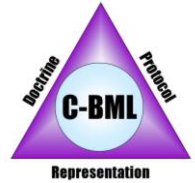
PTL – Prioritised Target List



- Targets – What the targets are
- DMPI – Desired Mean Point of Impact – Where the targets are
- Weapon Solutions – Which weapons are to be used against which targets
- PTL is used to assign targets to aircraft and missions



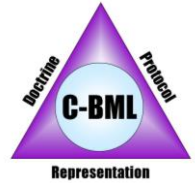
The ATO – Air Tasking Order



- Helps plan the use of air force assets:
 - Resource allocation – **which** aircraft are available, **where** they are based, what their capabilities are
 - Time coordination – **when** aircraft need to take off, **when** they need to be on station
 - Spatial coordination – **where** the aircraft will fly, what flight level
 - Interaction with ground and naval forces – CAS, SEAD, pre-determined ground targets
- Gives air crew their allotted tasks
- Does not 'micro-manage' the air crew tasks



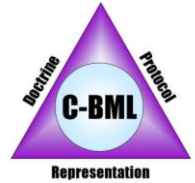
ATO Contents



- Header
- Groups of Tasks (per country, per service)
 - Groups of Missions
 - Aircraft
 - Route to: location, refuelling, target, recce, new airfield
 - Mission notes
- SPINS – Special Instructions – all free text, e.g.:
 - General information, ROE, Comms plan, EW plans
 - Free text is a challenge!



Example ADatP3 F058 ATO



EXER/UK C-BML Demo//

MSGID/ATO/UK Air Gp Cmd/0//

AKNLDG/NO//

TIMEFRAM/FROM:140001ZFEB2008/TO:142359ZFEB2008/ASOF:132000ZFEB2008//

AIRTASK/ATO A/3510N07901W/LOCATION OF COALITION AIR BASE//

Who – Tasker

TASKUNIT/23SQN//

AMSNDAT/AM01/-/ZZ/MC/JCP/-/BAT//

AMSNLOC/141325ZFEB/142000ZFEB/AWACS ORBIT/350/1A/LATM:3510N07901W/NAME:PT ALPHA//

When – Start & End

Where - Eln

Where

Ctl Measure

TASKUNIT/617SQN//

AMSNDAT/AM02/-/ZZ/MC/EW/-/BAT//

GTGTLOC/P/TOT:141325ZFEB/NET:141320ZFEB/TOF:141325ZFEB/MOBILE COMMAND
POST/ID:B1234F12345/CP/-/DMPID:351025.3N0790125.7W/W84//

6ROUTE

/ 1/3510N07901W/ IP/141400Z/450KTS/300

/ 2/3520N07908W/TRN/142000Z/450KTS/300

/ 3/3530N07914W/TRN/142500Z/450KTS/200

/ 4/3560N07918W/ RP/143000Z/450KTS/ 5//

Where – RouteWhere

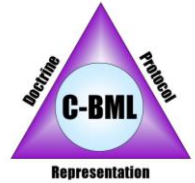
Header

Task 1

Task 2



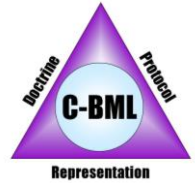
Review Process



- Battle Damage Assessment
- Assign recce aircraft
- Get reports & imagery
- Amend task orgs, etc
- Feed info into another targeting/planning/execution cycle



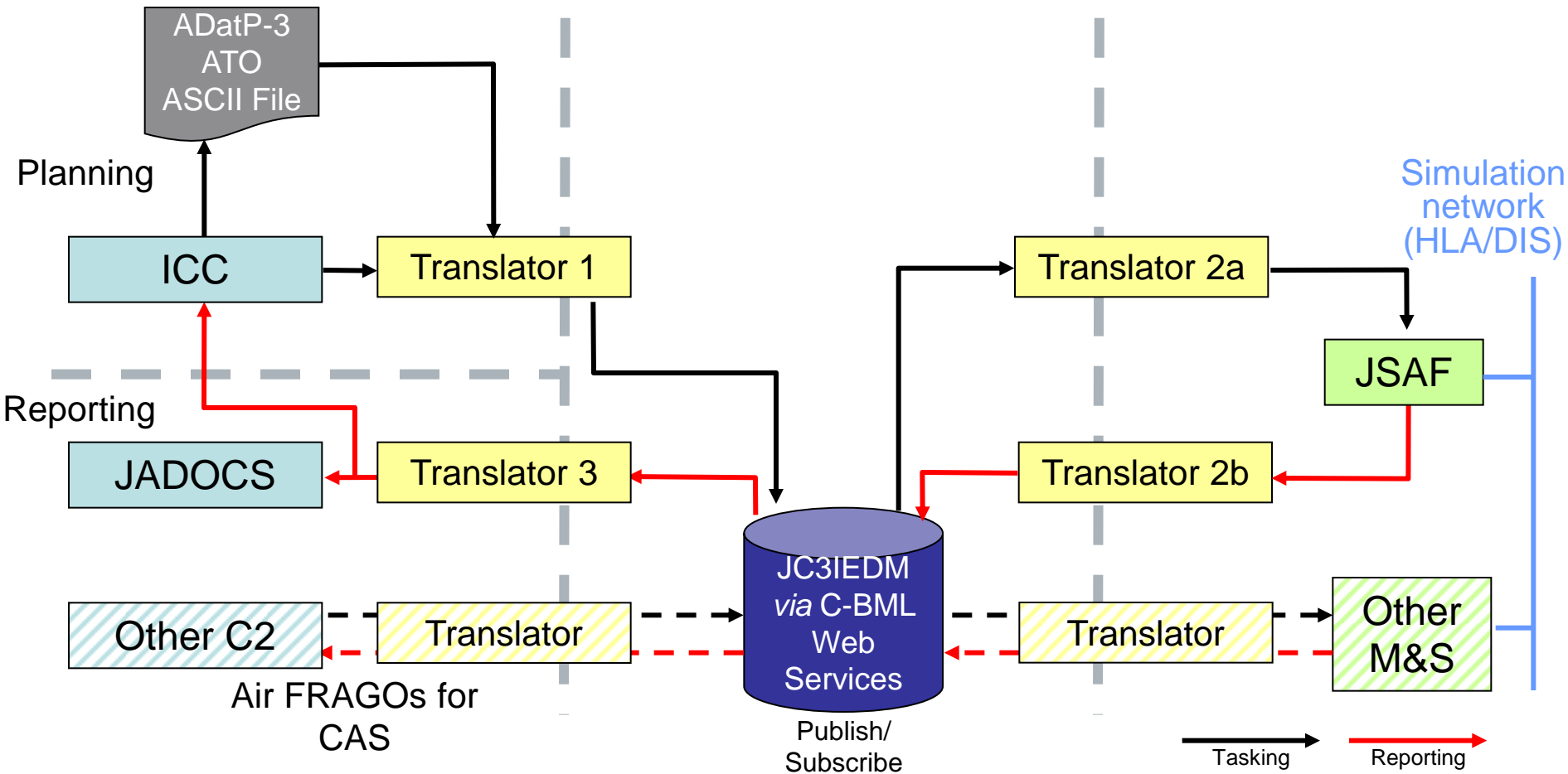
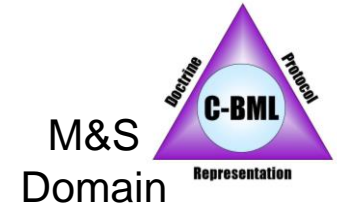
BML Requirements



- Resource allocation *not* required – this is an MSDL requirement
- Mission planning
- Mission execution
- Aircraft reporting
- Response to requests:
 - CAS – US MTF, ADatP-3 messages (CASREQ, AIRSUPREQ)
 - Scramble – associated air task data required
 - Corrections, rescheduled and cancelled missions
- C-BML FRAGO processing is appropriate
 - not part of BML, part of operating procedures

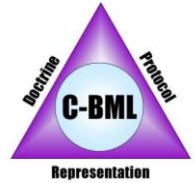
UK System

C-BML
Domain





ICC Data Tables

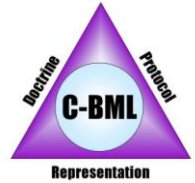


- ICC maintains numerous data tables in a database
- To generate a representative ATO a subset of these is required:
 - Who Units
 - Where Air bases, Routes, Patrol Areas, Targets*, etc
 - What Mission types
 - When Allocation and timing of missions

* Targets are also Affected Who



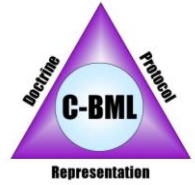
Air Additions to C-BML Schema



- Simple schema modifications:
 - <Task> split into:
 - <AirTask>, <GroundTask> & <MaritimeTask>
 - Not really necessary – will recommend all domains simply use <Task>
 - Locations added:
 - <height above ground level>
 - Reports added:
 - <velocity vector>



Timing Considerations

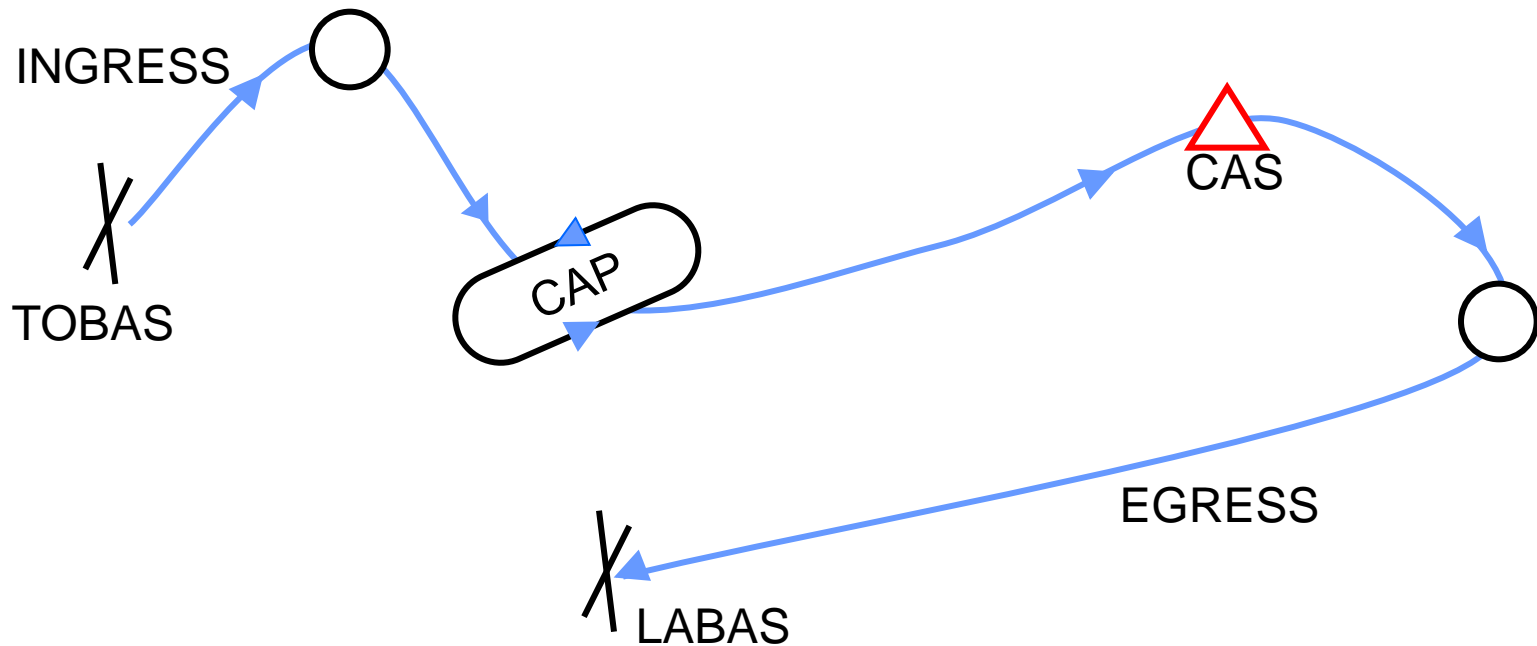


- Real aircraft fly with time-based goals, e.g. fly to location X to arrive at time T
 - ATO does not give intermediate timings
 - JSAF does not have any such behaviours – typically the behaviour will be: fly route R at speed S, arrival is consequential and speed is not moderated
 - Air Control Measures usually have a temporal validity:

C-BML* has always permitted the expression of a Tasker's control measure being associated with a particular Tasker for a specified period of time
- * 06S-SIW-68 Schade, Hieb

Sequencing Considerations

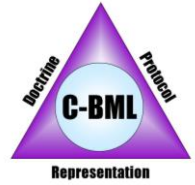
- A **single** mission in an ATO consists of a **sequence** of tasks



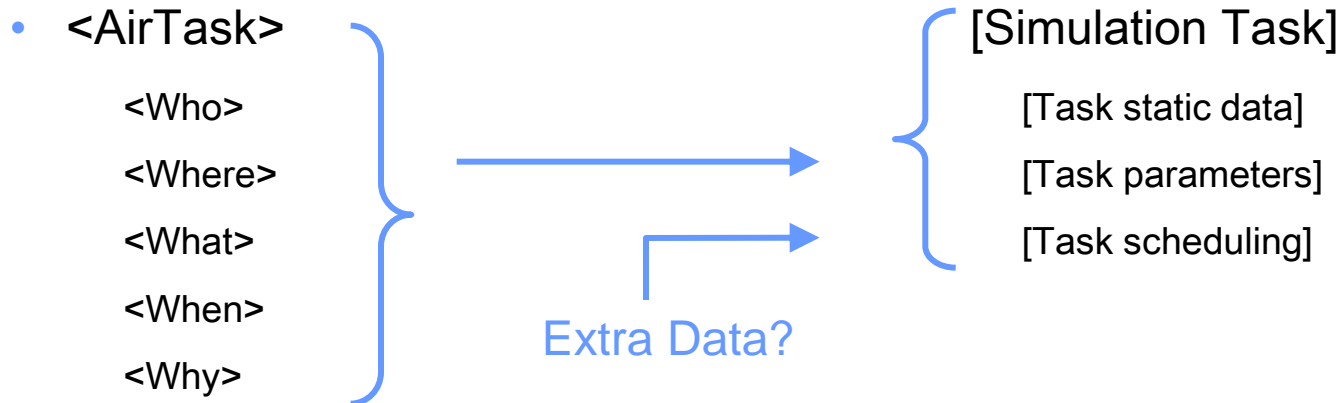
- C-BML requires this breaking down into single tasks
- Beware of default simulation behaviour at end of tasks, e.g. Orbiting or Landing



Mapping C-BML onto Simulation



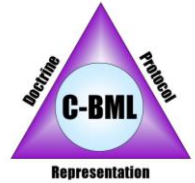
- Does a representative behaviour exist in the simulation?
- If so, can it be scheduled and tasked?
- Does it need extra information not available from the C2 system?



- In a Semi-automated simulation how acceptable is it to use human intervention?
- Can MSDL supply extra information?

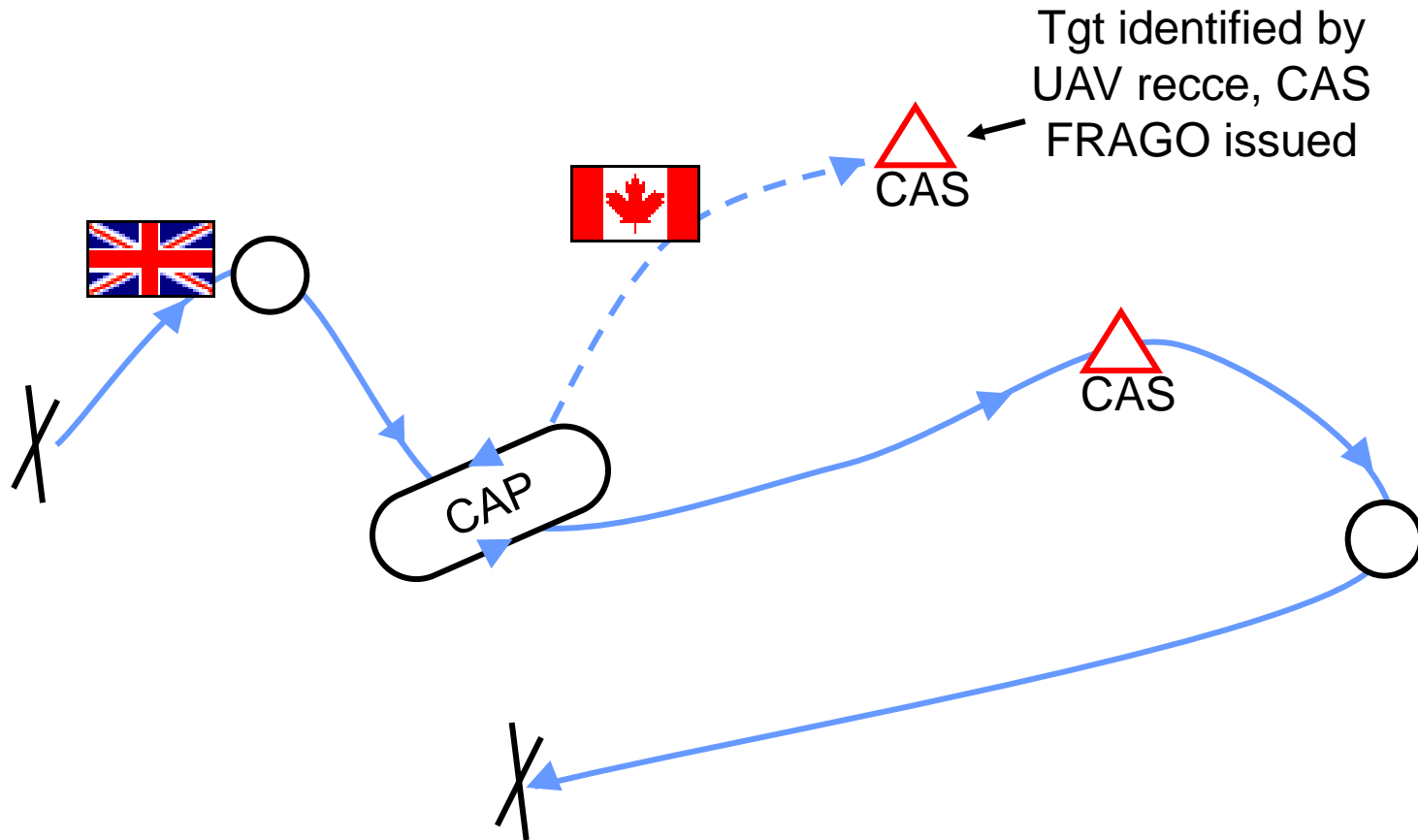
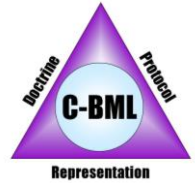


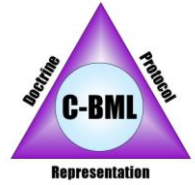
Task Mapping



Scenario	ATO Mission Type	C-BML			JSAF
		Where Class	Where Cat	What (JC3IEDM)	
Fly Route	AR	Line	Route	MOVE	Fly Route/Orbit
Air Refuel (Orbit)	AR	Area	Route	AERRFL	Race Track
Defensive Combat Air (Orbit)	DCA	Area	Route	AIRDEF	Race Track
Air Interdiction (Ground target)	AI	Point	Target	OFFAIR	Interdiction Mission
Airborne Command (Circular orbit)	ABC	Point	Air Control Point	ARCCTL	Orbit
Suppression of Enemy Air Defence (Jam orbit)	SEAD	Area	Route	WLDWSL	JAM

Example for Air FRAGO





Questions